

# SARASWATI MAHILA MAHAVIDHYALAYA, PALWAL

## LESSON-PLAN

Class: B.Sc-II<sup>nd</sup> Year (NM & CS): PHYSICS

Semester: ODD/EVEN ✓

Subject: Computer Programming & Thermodynamics Session: 2020-21

Lecture Number	Topic
1.	<u>UNIT-1</u> : Computer Programming Introduction of Computer; Basic Components of Computer and their Brief Explanation.
2.	Number System and its types; Number System Conversions and their numericals.
3.	ALGORITHM development Stages; Characteristics of an algorithm; Expressing ALGO's.
4.	Basic Control Structures of ALGO's (Sequence, Selection or Branching, Repetition or iteration or looping); Examples of ALGO's.
5.	Introduction to FLOW CHART → Definition, Symbols, Rules, Advantages and limitations; Examples.
6.	Programming Preliminaries; types of languages; Compilation of HLL FORTRAN introduction.
7.	Definitions of Constant; Variables. Explanation of FORTRAN constants
8.	Defining of the 'TYPES' of Variables in FORTRAN; Arithmetic operators and their expressions; Hierarchical Rules; Examples.
9.	Built-In functions; Examples and Revision of Constant, variables & operators
10.	Executable and Non-Executable statements; Input-Output statements
11.	Examples of READ, WRITE & PRINT statements; FORMAT statements; FORMAT Specifiers.
12.	Relational operators; Logical Operators; Expressions of Relational and logical operators; Examples.
13.	IF statements (Logical IF → Simple IF, logical Block IF. & Nested IF) their Expressions with help of Examples.
14.	Arithmetic IF statement and Do statement and its implementation
15.	GOTO statement → Conditional & unconditional; Assigned GOTO Examples
16.	Introduction to array; TYPE declaration statement of array Examples of it; Dimension statements
17.	Introduction to SUBPROGRAMS; SUBROUTINE; Some important key

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18.	Statement function ; SubProgram function ; Advantages of breaking a program into Subprograms.
19.	Revision of Unit-I ; ASSIGNMENT ; DISCUSSION.
20.	UNIT:II → Thermodynamics-I Introduction of thermodynamics ; laws of thermodynamics ; thermodynamical Processes.
21.	Reversible & irreversible process ; P-V Diagram ; CARNOT ENGINE
22.	Carnot Engines Refrigerator and Numericals
23.	Second law of thermodynamics and Carnot Theorem.
24.	KELVIN'S thermodynamic scale of temperature → Absolute Zero on work scale ; Unattainability of absolute zero
25.	Pollution due to internal Combustion Engine
26.	Joule's free expansion ; Joule - Thomson porous plug Experiment.
27.	Joule-Thomson Effect
28.	Joule - Thomson effect & Adiabatic Cooling ; Numericals
29.	Entropy ; Entropy and Adiabatic Curves.
30.	Change in Entropy → Path Independence → Reversible Process
31.	Change in Entropy in an irreversible process ; Various aspects of Entropy.
32.	Temperature - Entropy (T-S) diagram ; Numericals.
33.	Entropy of a Perfect Gas
34.	Third law of thermodynamics → Statement & derivation ; Numericals.

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35	Production of low temperatures ; Introduction of liquefaction Cascade Process - liquefaction of oxygen.
36	LINDE'S method → liquefaction of AIR ; liquefaction of Hydrogen.
37	KONNEN'S method → liquefaction of Helium. Revision of liquefaction.
38	Revision of Unit-II ; Assignment Given ; Discussion of important topics
39	<u>UNIT-II</u> → Thermodynamics - II Phases & Phase change ; latent heat ; first latent heat equation.
40	Effect of Pressure on ① Boiling point of a liquid ② melting point of a solid ; Second latent heat eq <sup>n</sup> .
41	Numericals of latent heat equations ; Specific heat of saturated vapour
42	Phase diagram and triple Point ; Conceptual questions discussion
43	Maxwell's thermodynamical Relations
44	Thermodynamical functions → ① Internal Energy.
45	Thermodynamical functions ② Enthalpy ③ Helmholtz free energy.
46	Thermodynamical functions ④ Gibbs free energy ; Thermodynamical Relations ① Internal energy
47	Thermodynamical Relations ② Helmholtz function ③ Enthalpy ④ Gibbs Potential
48	Applications of thermodynamical Relations
49	Applications of thermodynamical Relation (contd) ; Numericals
50	Theory of Joule - Thomson effect using thermodynamical relations
51	Revision of Unit-3 ; Numericals & Discussion.

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